

CCP Composites Achieves Superior Energy Performance Gold Certification

The Superior Energy Performance (SEP) plant certification program is being tested through pilot projects, and one of the first participants was the CCP Composites plant in Houston, Texas. Working with the U.S. Department of Energy's (DOE's) Industrial Technologies Program (ITP), CCP Composites implemented a management system for energy in accordance with American National Standards Institute Management System for Energy (ANSI/MSE 2000:2008) and SEP requirements, had two major energy-using systems assessed for energy efficiency, and implemented projects to improve energy efficiency. These actions resulted in an energy performance improvement of about 14% over two years. CCP Composites' Houston plant is now certified at the SEP Gold level, and has a management system in place to proactively manage the facility's energy resources in the future so it will continue to sustain improvements in energy performance.

Superior Energy Performance

SEP is a market-based, ANSI-accredited plant certification program that provides industrial facilities with a roadmap for achieving continual improvement in energy performance while boosting competitiveness. To become certified, an industrial plant must implement a management system for energy in conformance with International Organization for Standardization (ISO) 50001 (which is replacing ANSI/MSE 2000:2008) and make energy performance improvements.



CCP Composites

CCP Composites is a world leader in the production and distribution of gel coats, composites polyester resins, coatings resins, and emulsions. CCP Composites is the number one producer of gel coats in the world. CCP Composites' corporate headquarters, primary research facilities, technology center, pilot lab, new powder coating resins plant, and 1 of 14 manufacturing plants are all located in North Kansas City, Missouri.

CCP Composites' Houston facility is a synthetic resin (polymer) manufacturing plant, which supplies products to the composites

and coatings industry. Unsaturated polyester resin is the primary product made. The major energy-consuming processes include process heaters (three hot oil boilers) and a steam boiler. Other large energy-using systems include a thermal oxidizer, compressed air plant, chiller, and cooling water pumps. Between 1998 and 2005, the Houston plant experienced a dramatic increase in its energy expenditures, with an escalation of



Photo courtesy of Texas Industries of the Future

Energy Management Demonstration Pilots

The U.S. Department of Energy's Industrial Technologies Program partnered with the U.S. Council for Energy-Efficient Manufacturing (U.S. CEEM), states, and regional teams to conduct energy management demonstrations to help industrial manufacturing plants achieve ambitious energy intensity reduction objectives through strategic energy management.

Companies that participate in the demonstrations test the elements of Superior Energy Performance (SEP) and a forthcoming American National Standards Institute-accredited plant certification program developed by U.S. CEEM. The regional teams help industrial facilities and manufacturing plants implement an energy management system to improve energy performance and reduce energy costs. As a demonstration site, facilities receive training and support to:

- Implement International Organization for Standardization (ISO) 50001 and energy management strategies that lead to continual energy performance and energy intensity improvement
- Reduce energy and other operational costs and carbon emissions
- Monitor and verify energy performance improvements.

At the close of the demonstration project, plants pursue certification through SEP and are prepared to meet the requirements of ISO 50001.

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more than 100% in annual energy costs. In 2008, energy was the second largest cost for the plant, accounting for about 20% of the plant's operating budget.

Energy Management System Implementation

CCP Composites integrated an energy management system into its existing management systems for quality (ISO 9001) and the environment (ISO 14001). CCP Composites then developed an energy management policy, set energy performance improvement objectives, and developed an energy profile for their Houston site and calculated its energy baseline. Finally, CCP Composites conducted a self audit and management review prior to the third-party audit that led to MSE 2000:2008 and SEP certification.

Management System for Energy

The CCP Composites' Houston plant's energy management program was in its infancy when the site joined the SEP pilot program. The company's other management systems were robust and had been fully implemented and audited. The plant actively

involves its employees in continual improvement activities and has experienced significant improvement from other management systems.

CCP Composites was successful in incorporating its new energy management system into its integrated health, safety, quality, and environmental management system. Use of the existing management system structure for implementation of the energy management system made the implementation process

easier. In addition, because the management system is part of a corporate-wide program, it has exposed other CCP Composites sites not participating in the pilot project to energy management system concepts. Additional employees beyond those participating in the pilot have become aware of energy management processes, and the implementation of energy management with a cross-functional team has helped to ensure that energy management extends beyond the Houston plant's boundaries.

Energy Profile

Developing an energy performance indicator (EnPI¹) that meets SEP measurement and verification requirements necessitates a thorough knowledge of the factors that impact a plant's energy intensity, as well as the ability to use statistics to normalize

ASME Energy System Assessment Standards

In 2010, the American Society of Mechanical Engineers (ASME) published four new standards that establish requirements for conducting energy system assessments at industrial facilities. Many industrial facilities have the potential to increase the efficiency of their systems, but have difficulty doing so because there is no market definition for energy system assessment services. The absence of an accepted definition makes it difficult for service providers to establish market value for their services and for consumers to determine the relative quality of assessment services. The four standards cover process heating, pumping, steam, and compressed air systems. The energy assessment standards are intended to assist plant personnel in identifying cost-effective projects that often have short payback periods. The standards address the topics and requirements for organizing and conducting assessments, analyzing the data collected, and reporting and documentation. As part of this effort, accompanying guidance documents, which provide technical background and application details for utilizing the standards, are also available from ASME.

data using techniques such as linear regression analysis. CCP Composites' staff received training on how to develop an energy performance profile using these methods, and then developed historical EnPIs for the Houston plant, which is a requirement for SEP certification.

Energy Savings Assessments

In September 2008, DOE Energy Experts tested proposed American Society of Mechanical Engineers system assessment standards for steam and process heating systems at the CCP Composites' Houston plant. These assessments identified opportunities that could reduce natural gas use by 30% in the process heating and steam systems. CCP Composites has implemented short-term actions and low-cost investments that have resulted in considerable savings. The company is considering implementing larger capital projects.

Internal Audit

Because CCP Composites was familiar with the internal audit process from its experience with ISO 9001 and 14001, completing the internal audit for ANSI/MSE 2000:2008 was a familiar challenge. The biggest hurdle CCP Composites encountered was realizing that many portions of the management system for energy are directly tied to energy performance. Issues covered by the management system, such as meter calibration and project measurement, are directly linked to the performance validation.

Third-Party Audit and Certification

The Phase I audit included a test of the offsite certification of SEP. Preparing all of the documentation for the offsite certification proved to be almost as challenging as an onsite audit. The offsite review included both a document review and a review of the energy savings model. During the Phase I audit there was some misunderstanding of what needed to be sent to the auditor

ISO 50001

International Organization for Standardization (ISO) 50001 establishes a framework for industrial plants, commercial facilities, or entire organizations to manage their energy. The document is based on the common elements found in all ISO management system standards, which aligns it with ISO 9001 (quality management) and ISO 14001 (environmental management). ISO 50001 provides a framework for integrating energy performance into management practices.

¹ Ratio of current energy usage to baseline usage that would have occurred in the absence of energy efficiency improvements.

for review, as well as concerns about the confidentiality of sending documents offsite. This uncertainty led to some of the initial Phase 1 non-conformance findings. These non-conformances included issues in both the management system and the energy performance measures.

CCP Composites undertook the steps necessary to correct the initial findings so that the Phase II onsite audit resulted in a reduced number of minor non-conformances. The corrective actions for all non-conformances were reviewed and accepted by the third-party verification body KEMA. KEMA was the certification body that performed the SEP and ANSI/MSE 2000:2008 audit. The successful energy management system audit results, and verified energy savings of about 14%, allowed CCP Composites to qualify for SEP Gold-level certification.

As a result of confidentiality and practicality issues in the Phase I offsite audit at CCP Composites and other SEP pilot sites, SEP is dropping the option for “third-party offsite review” certification and is instead using the standard approach of a “readiness review” (Phase 1 audit), which will involve an evaluation of additional records, including internal audit results, a management review, and a list of major energy projects and energy uses.

Barriers, Lessons Learned, and Results

Barriers

The biggest barrier CCP Composites encountered was the economic downturn that occurred shortly after the company began implementing its energy management system. Because of the recession’s impacts, staff resources of the original team implementing ANSI/MSE 2000:2008 were reduced. As part of this, the resources used for SEP implementation, which were primarily at the corporate level, were shifted to the plant level. Implementation became more of a bottom-up push from the plant instead of a top-down approach at the corporate level. A corporate representative did remain on the team after this change.

An example of how this impacted the management system for energy’s implementation can be seen in how CCP Composites

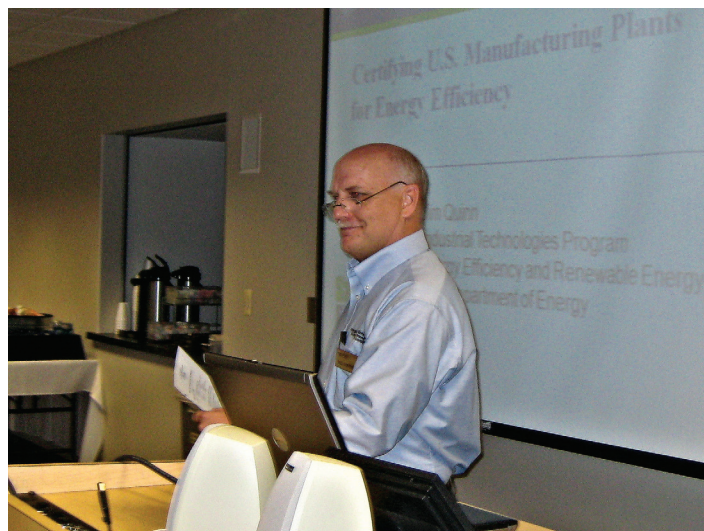


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held meetings. Before the change in staff levels, in-person meetings were held regularly. After the change, fewer meetings were realized and many meetings were done via webcasts. Webcasts and teleconferencing meetings may be the new reality for sites implementing these types of management systems.

Even with this change, having corporate-level support from the beginning and continued support after the focus shifted to the plant level was a key to success. Coinciding with the implementation of an energy management system, CCP Composites’ parent company announced an energy use improvement and savings objective. The overall objective aligned with the plant-level SEP objectives already implemented by the Houston facility. CCP Composites’ corporate staff continues to communicate the energy management program with its parent company, which has large facilities across the globe.

Lessons Learned

CCP Composites learned that it needs to make sure the plant understands the role of the corporate management representative working with them to implement the management system for energy. Further, it is important to make sure that plant staff understand the relationship that should be fostered between the staff working on the different management systems for quality, the environment, safety, and energy management.

Other lessons learned include the following:

- Understanding the plan-do-check-act model and the relationship between the management systems and the energy-using systems
- Understanding and communicating the relationship between the energy management system and SEP requirements
- Reaching agreement on an acceptable auditing schedule before the audit
- Recognizing the plant’s limited resources.

Looking at Energy from a System Perspective versus the Project Level

Implementing an energy management system has caused a shift in the overall perception of the role energy plays in manufacturing sites. In the past, energy was perceived as a budget line item or cost. There was not always a concentrated focus on individual projects or how energy was used in each manufacturing process. Now, each system is included in energy analysis and impacts on energy intensity are a focal point. This has impacted some other management processes—such as the Occupational Safety and Health Administration Management of Change process—which now includes impacts on energy usage.

Connection to Other Parts of the Organization

CCP Composites’ management system for energy is integrated throughout the organization. As an example, prior to implementation of energy management, the energy purchasing function was not intuitively considered part of the energy management process. Now, energy management has led the way to awareness, including

utility service accountability and how energy service and costs can be more actively managed.

Keys to Success and Results

One key to success highlighted by the energy team is having a company-wide integrated document system for all management systems. With CCP Composites’ system, when a new sub-system within a management system is created, it gets implemented throughout the corporation. The integrated document system, combined with the company intranet, allowed CCP Composites to integrate all management system processes throughout the company.

A key to success is having a staff member on the energy team that has the desire and passion to put structure around the process. In implementing a management system, someone needs to assume the management representative role, which is a key position. This person needs to understand how management systems work. Going through the lead auditor training for ISO 9001 and 14001, as well as the energy management specific training provided by ITP as part of the pilot proved invaluable to preparing the person for this role.

Another key to success is to prepare for the audit and work with the lead auditor before the auditor(s) travel to the plant for the onsite portion of the audit. If plant personnel feel like they do not understand part of the audit process, they should get clarification before auditors come to the plant. There should be a mutual understanding of the interpretations of the audit process and the requirements for both the energy management standard and SEP requirements.

CCP Composites was able to see how the management system for energy was working when the Houston plant’s team leader relocated shortly after it was implemented. Normally, this would have caused a major disruption to the energy program, but because a culture of continuous improvement was established through the management system, the plant’s staff was in a position to maintain and continue improving energy performance.



Photo courtesy of Texas Industries of the Future

CCP Composites’ Houston plant attained SEP Gold Certified Partner status and achieved a 14.9% improvement in energy efficiency over a two-year period. The energy efficiency measures taken by CCP Composites resulted in 31,700 million British thermal units of energy saved and allowed the company to capture \$250,000 in cost savings per year. The participation of the CCP Composites’ Houston plant in the SEP program demonstrates that small plants—with the appropriate corporate commitment, support, and strategy—can reap significant benefits from the implementation of an energy management system.

In the future, CCP Composites may involve its other facilities in SEP certification. The CCP Composites integrated management system now includes energy management, and each CCP Composites site continues to integrate specific energy management practices into its routine processes.

CCP Composites values the recognition of the energy management and SEP certification. CCP Composites will continue to communicate to its parent organization, customers, and suppliers the importance of implementing a culture of continual improvement in energy performance.